than these. May shows no regular retrogression of temperature, as in northern countries, though it is more variable than other months, and there is no Martinmas summer in autumn; thus confirming the doctrine that the Alps divide Europe into two meteorological regions. There are also variations coincident with the periods of sun-spots. Thus, from 1763 to 1768, from 1812 to 1817, from 1829 to 1838, from 1855 to 1858, the annual temperature was lower than the average; while from 1769 to 1772, from 1778 to 1781, from 1790 to 1794, from 1796 to 1798, from 1824 to 1828, from 1861 to 1872, excluding the years 1864 and 1871, the temperature was constantly higher.—The next paper is by Prof. Gaetano Cantoni, On the direct assimilation of nitrogen from the atmosphere. Having compared the production of corn and clovers, the author concludes that the Leguminosæ can absorb nitrogen from the air, but that Graminæ have not this power.—Prof. Tullio Brugnatelli and Dr. Pelloggio publish the results of their examination of the mineral water of Monte Alieo. It is sulphurous, and will keep for months in sealed bottles, but ultimately develops Cryptococcus brumes. Its temperature is 13° C.; it smells like a saturated solution of sulphuric acid, but is not unpalatable. A litre gives a solid residue of 3·96 grains, chiefly formed of chloride of sodium and sulphates of magnesia and lime.—Prof. Leopoldo Maggi contributes a note On the distinctions introduced in spontaneous generation, and defines clearly and adopts the terms agenia, necrogenia, and xenogenia, introduced by Milne-Edwards, and suggests that agenia may be divided into inorganic and organic agenia. At the reading of this paper, Prof. Sangalli remarked that he found long Bacteria and Micrococcus in an ulceration in the throat, and the same organisms in a diseased stomach.—The next paper is by Prof. Achille de Giovanni: Clinical and anatomical observations concerning the pathology of the sympathetic system; in which his researches respecting the infiltration of the intercostal ganglia are continued. In a former paper he attributed the infiltration to the growth of numerous adventitious vessels, but in a section of a ganglion hardened in a solution of bichromate of potash the presence of a very fine connective tissue is easily seen to accompany the nerve-tubes and involve the ganglia, and in this he believes some deposits to take place.—The last paper in Part xi. is by Prof. Sayno, On a machine for drawing spirals, which he figures.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, Jan. 21.—On the anatomy of the connective tissues, by G. Thin, M.D.

Transparent animal tissues, when sealed up fresh in aqueous humour or blood-serum, by running Brunswick black round the edge of the cover-glass, undergoes a series of slow changes, by which, mostly within a period of two to five days, anatomical elements otherwise invisible become distinct. The paper is chiefly a record of observations made by this method. The author describes the results of its employment in the case of sections of the cornea, in which the stellate-branched cells are seen, after about twenty-four hours, to consist of masses of protoplasm, sharply defined. He has also similarly examined tendon neurilemma, fibrillary tissue, nerve-bundles, and muscular fibre; and compared the results with those arrived at by other methods of treatment.

Jan. 28.—On the atmospheric lines of the solar spectrum, illustrated by a map drawn on the same scale as that adopted by Kirchhoff, by J. H. N. Hennessey, F.R.A.S. Communicated by Prof. Stokes, Sec. R.S.

The spectroscopic observations described in this paper were made with instruments belonging to the Royal Society, and in accordance with certain suggestions which had been made to the author by a committee appointed in consequence of a letter of his to Sir Edward Sabine, president, dated 13th February, 1866. In view of his residence at a considerable height above the sea-level, and of the exceedingly clear atmosphere prevailing at some periods of the year, it was suggested that the locality was peculiarly favourable for a determination of the lines of the solar spectrum due to atmospheric absorption; and that for this purpose the solar spectrum when the sun was high should be compared with the spectrum at sunset, and any additional lines which might appear in the latter case should be noted with reference to Kirchhoff's map.

Accordingly the author set to work with the spectroscope first supplied to him, and in the autumns of 1868 and 1869 mapped the differences in question from the extreme red to D. These results appeared in the "Proceedings of the Royal Society" for June 16, 1870, and the map of the spectra, sun high and sun low, of the region in question forms Plate I. of the nineteenth volume.

The instrument first supplied to the author was found in practice to be of insufficient power to permit of ready identification of the lines seen in the spectrum of the sun when high with those represented in Kirchhoff's map; and a new spectroscope of greater power was supplied to him, which reached him at the end of the year 1871. Observations for a continuation of his map had in the mean time been taken with the old instrument in the autumns of 1870 and 1871, and the spectrum mapped from D to F, in continuation of the former map. But the new instrument proved so superior to the old, that the author determined to map the whole spectrum afresh from observations made with it, using the former maps merely as skeleton forms. The observations with the new instrument were carried on in the autumns of 1872 and 1873, and the map now presented is the result.

Observations were also made to ascertain whether any of the lines which came out when the sun is low, especially those which are also seen, but narrower and less conspicuous, when the sun is high, could be due, not to *specific* atmospheric absorption, but to the general weakening of the light, causing parts of the spectrum already weakened by *solar* absorption to appear dark when a *general* weakening of the light was superinduced, though they had appeared bright when the light was strong. For this purpose the spectrum of the sun when high, as seen in the usual way, was compared with the spectrum when the intensity was artificially reduced in various ways. The best comparison was obtained by taking advantage of a natural phenomenon. At Mussoorie, late in the autumn, a haze, visible at sunset, extends over the low country, and grows day by day in height, till it causes the sun virtually to set in haze while still 3° or more above the horizon, whereas in the clear season it is visible till it attains a depression of 1½°. The result of the comparison was, that none of the additional lines were discovered to have any other origin than selective atmospheric absorption.

Royal Horticultural Society, Jan. 20.—Scientific Committee.—Dr. J. D. Hooker, C.B., Pres. R.S., in the chair.—The Rev. M. J. Berkeley exhibited specimens of vine stems with large burr-like excrescences, which he suggested might be due to the attacks of a fungus like *Exobasidium*.—Mr. Worthington Smith exhibited a drawing of the microscopical appearance of the swellings on cucumber roots, confirming the accuracy of the observation long since made by the Rev. M. J. Berkeley, which connected these swellings with the presence of nematoid worms—probably an undescribed species of *Tylenchus*.—Prof. Thiselton Dyer called attention to a communication made to the Entomological Society by Prof. Forel, in which there was evidence to show that the Phylloxera had been introduced into vineries belonging to Baron Rothschild in the commune of Pregny, in the canton of Geneva, from England. The Phylloxera was discovered in England in 1863 by Prof. Westwood.—Prof. Thiselton Dyer also called attention to the statement in the *Daily News* (Jan. 19), that the Imperial Chancellor had introduced at the sitting of the Federal Council at Berlin on Jan. 18, an ordinance "prohibiting the importation of potatoes and the refuse and packing materials of potatoes from the United States," the object being to prevent the Colorado beetle from being imported into Germany. It was stated that the English Government had refused to prohibit the entry of American potatoes, on the ground that "it does not appear that the eggs or larvæ of the beetle have been or are deposited in the tuber of the potato." Mr. Andrew Murray described from his own observation the ravages effected by the beetle in Canada. Mr. McLachlan remarked that the beetle seems to have first spread from Mexico.—Prof. Thiselton Dyer stated with reference to the fruiting of *Hibiscus rosa-sinensis*—which had been said on the authority of Dr. Cleghorn not to take place even in India—that ripe capsules had been obtained after artificial fertilisation at Mauldslie Castle, Carluke, N.B., in 1871 and 1872, and plants raised from the seeds.—Dr. Masters exhibited specimens from Mr. Corderoy, of Didcot, of mistletoe parasitic on itself.

General Meeting.—Mr. W. A. Lindsay in the chair.—The Rev. M. J. Berkeley commented on the objects exhibited.—Mr. Bull showed a fine collection of Cycadaceous plants.—Mr.

Parker sent specimens of *Aponogeton distachyon*, flowered in the open air at Tooting, in a pond supplied by a spring, the temperature of which never fell below freezing-point.

Anthropological Institute, Jan. 26.—Prof. Busk, F.R.S., president, in the chair.—Anniversary meeting.—In the Report for 1874, the Council stated that the Institute had been enabled through the liberality of its members to pay off the debt which had so long burdened it, and that one of the immediate advantages arising from its improved position would be the more regular issue of its *Journal*, which in future would contain varied anthropological news and notices in addition to its usual proceedings.—In his address, on his retiring from the presidency, Prof. Busk gave a summary of the chief works and memoirs on the many branches of anthropology that had appeared during the past year, especially referring to the labours of Prof. Owen, M. Mortillet, Dr. P. Broca, Dr. A. B. Meyer, Madame Royer, &c.; and in conclusion, he drew attention to the comprehensive range of subjects contained in the proceedings of the Institute, and to the professed aim of the Council to exclude no subject that could possibly be embraced under the general term of Anthropology. The officers and Council to serve for 1875 were elected as follows:—President, Col. A. Lane Fox, F.S.A. Vice-Presidents: Prof. George Busk, F.R.S., John Evans, F.R.S., A. W. Franks, F.R.S., Francis Galton, F.R.S., George Harris, F.S.A., Sir John Lubbock, Bart., F.R.S. Directors: E. W. Brabrook, F.S.A., F. W. Rudler, F.G.S. Treasurer, Rev. Dunbar I. Heath, M.A. Council: J. Beddoe, M.D., F.R.S., W. Blackmore, H. G. Bohn, F.R.G.S., Hyde Clarke, J. Barnard Davis, M.D., F.R.S., W. Boyd Dawkins, F.R.S., Robert Dunn, F.R.C.S., David Forbes, F.R.S., Sir Duncan Gibb, Bart., M.D., Chas. Harrison, F.R.S.L., J. Park Harrison, M.A., Prof. T. McK. Hughes, F.G.S., T. J. Hutchinson, F.R.G.S., Prof. Huxley, F.R.S., F. G. H. Price, F.R.G.S., J. E. Price, F.S.A., C. R. Des Ruffières, F.R.S.L., Lord Arthur Russell, M.P., Rt. Hon. D. H. Stone, E. Burnet Tylor, F.R.S.

Medical Microscopical Society, Jan. 15.—Mr. Jabez Hogg, the retiring president, in the chair.—From the report of the committee it appeared that the society was in a flourishing condition, the number of members being 135. The number of papers read during the past year was sixteen, besides several minor communications, all of which were followed by brisk discussion. Above 100 specimens were exhibited during the year, and eighteen presented to the society. A present was also announced of a microscope for use in the *exchange* of specimens, a system which is found to work well and offers great facilities for obtaining a large collection of good preparations. The treasurer's report showed a balance of 15*l.* 10*s.* The following officers were elected:—President, Dr. J. F. Payne. Vice-Presidents: Mr. Jabez Hogg, Mr. W. B. Kesteven, Mr. H. Power, Dr. U. Pritchard. Treasurer, Mr. T. C. White. Hon. Secretaries: Mr. C. H. Golding Bird, Mr. J. W. Groves. Committee:—St. Bartholomew's, Mr. J. A. Omerod; Charing Cross, Dr. M. Bruce; St. George's, Mr. E. C. Baber; Guy's, Mr. F. Durham; King's, Mr. H. S. Atkinson; London, Mr. J. Needham; St. Mary's, Mr. George Giles; Middlesex, Dr. S. Coupland; St. Thomas', Dr. W. S. Greenfield; University College, Mr. E. A. Schäfer; Westminster, Dr. W. H. Allchin; General Profession, Dr. Foulerton. The retiring president then read an address.

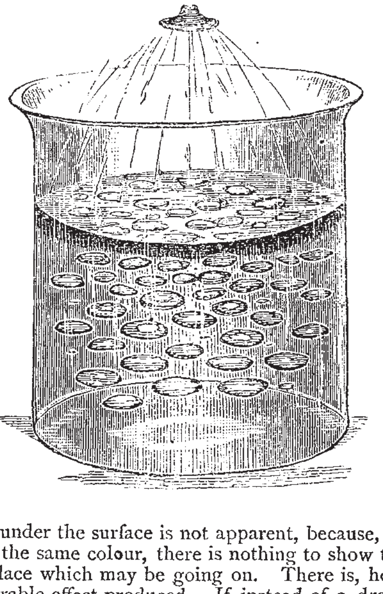
Dublin

Royal Irish Academy, Dec. 14.—William Stokes, F.R.S., president, in the chair.—Dr. S. Ferguson, vice-president, read a paper on further Ogham texts from Monataggart, County Cork.—Mr. W. Archer read a paper descriptive of the apothecia and spores found by him in two species of *Scytonema* and two of *Sirosiphon*, and one of *Stigonema*, all of them specifically different from any of the few similar cases hitherto recorded.—Mr. R. C. Tichborne read a paper entitled "Laboratory Notes:" On the solution of alloys and metals by acids; on fluorescence as a means of detecting adulteration; on the printing inks of the 16th and 17th centuries.—Mr. G. R. Leeper read a paper on retro-peritoneal cavities in man.

Manchester

Literary and Philosophical Society, Dec. 29, 1874.—Mr. E. W. Binney, F.R.S., vice-president, in the chair.—On a case of reversed chemical action, by Mr. James Bottomley, B.Sc. Having observed the solubility of iodine in a solution of borax, an experiment was made to see what the result of this solution would be, expecting to obtain a combination of soda with excess of acid. 27·8475 grms. of borax were dissolved in about 250 grms. of water. The iodine was added at hazard, the quantity used being nearly seven grms. When assisted by heat, almost the whole of this quantity dissolved in the solution. The solution, which amounted to about 200 cc., had only a faint yellowish tint. Being set aside for some days, it deposited crystals which proved to be ordinary borax, for 0·5932 grms. of the crystals lost by heating 0·2773 grms. of water of crystallisation, corresponding to 46·75 per cent., the theoretical quantity being 47·13. After removing the crystals the solution was still further evaporated in a retort. As the evaporation proceeded, instead of the faint yellow tinge disappearing as was anticipated, the colour of the solution began to darken, finally becoming opaque owing to the quantity of free iodine in solution; vapours of iodine were also given off along with the steam. Thus the iodine which had previously dissolved and chemically united with the soda when the solution was dilute, was displaced and eliminated in the free condition when the mixture was past a certain degree of dilution. The explanation of this reversal of chemical action is as follows. When sodic borate is diluted with water, its constituents are so far dissociated that the iodine acts towards the soda in the same way as it would towards caustic soda, sodium iodide and sodium iodate being the result. When, however, the solution is conrcentrated, the boracic acid, notwithstanding its feebly acid powe, is able to displace continuously and simultaneously small quantities of iodic and hydroidoic acid from combination with sodium, but these two acids cannot coexist in the free state; by mutual reaction they give iodine and water.

Jan. 12.—Mr. R. Angus Smith, F.R.S., vice-president, in the chair.—On the action of rain to calm the sea, by Prof. Osborne Reynolds, M.A. There appears to be a very general belief amongst sailors that rain tends to calm the sea, or, as I have often heard it expressed, that rain soon knocks down the sea. Without attaching very much weight to this general impression, my object in this paper is to point out an effect of rain on falling into water which I believe has not been hitherto noticed, and which would certainly tend to destroy any wave motion there might be in the water. When a drop of rain falls on to water the splash or rebound is visible enough, as are also the waves which diverge from the point of contact; but the effect caused by the drop under the surface is not apparent, because, the water being all of the same colour, there is nothing to show the interchange of place which may be going on. There is, however, a very considerable effect produced. If instead of a drop of rain we let fall a drop of coloured water, or, better still, if we colour the topmost layer of the water, this effect becomes apparent. We then see that each drop sends down one or more masses of coloured water in the form of vortex rings. These rings descend with a gradually diminishing velocity and with increasing size to a distance of several inches, generally as much as eighteen, below the surface. Each drop sends in general more than one ring, but the first ring is much more definite and descends much quicker than those which follow it. If the surface of the water be not coloured this first ring is hardly apparent, for it



appears to contain very little of the water of the drop which causes it. The actual size of these rings depends on the size and speed of the drops. They steadily increase as they descend, and before they stop they have generally attained a diameter of from one to two inches, or even more. The cut on p. 279 shows the effect which may be produced in a glass vessel. It is not that the drop merely forces itself down under the surface, but in descending carries down with it a mass of water which when the ring is 1 inch in diameter would be an oblate spheroid having a larger axis of 2 inches and a lesser of about 1½ inches. For it is well known that the vortex ring is merely the core of the mass of fluid which accompanies it, the shape of which is much the same as that which would be formed by winding string through and through a curtain ring until it was full. It is probable that the momentum of these rings corresponds very nearly with that of the drops before impact, so that when rain is falling on to water there is as much motion immediately beneath the surface as above it, only the drops, so to speak, are much larger and their motion is slower. Besides the splash, therefore, and surface effect which the drops produce, they cause the water at the surface rapidly to change places with that at some distance below. Such a transposition of water from one place to another must tend to destroy wave motion. This may be seen as follows. Imagine a layer of water adjacent to the surface and a few inches thick to be flowing in any direction over the lower water, which is to be supposed at rest. The effect of a drop would be to knock some of the moving water into that which is at rest, and a corresponding quantity of water would have to rise up into the moving layer, so that the upper layer would lose its motion by communicating it to the water below. Now, when the surface of water is disturbed by waves, besides the vertical motion the particles move backwards and forwards in a horizontal direction, and this motion diminishes as we proceed downwards from the surface. Therefore in this case the effect of rain-drops will be the same as in the case considered above, namely, to convey the motion which belongs to the water at the surface down into the lower water where it has no effect so far as the waves are concerned, and hence the rain would diminish the motion at the surface, which is essential to the continuance of the waves, and thus destroy the waves.—On the stone mining tools from Alderley Edge, by Prof. W. Boyd Dawkins, F.R.S.—Archaic iron mining tools from lead mines near Castleton, by Mr. Rooke Pennington.

PARIS

Academy of Sciences, Jan. 25.—M. M. Frémy in the chair.—The following papers were read:—On the decrease of the upper Doubs and the means to prevent it, by M. H. Resal.—On the effect produced by the application of armatures on magnets, by M. J. Jamin.—On the mineral substances contained in the juice of beet and the potash extracted from it, by M. E. Peligot.—On the fertilisation of the genus *Viola*, with special reference to *Viola tricolor hortensis*, by M. A. Trécul.—On the phosphorescence of Marine Invertebrata, by M. de Quatrefages.—M. Daubrée then read a letter received from H.M. Don Pedro, Emperor of Brazil, giving a description of an earthquake which took place on Oct. 30 last in the province of St. Paul.—The same gentleman then communicated a memoir by M. J. D. Dana, on the Pseudomorphs of Serpentine and other minerals from the mine Tilly-Foster, Putnam County, State of New York.—Researches on albuminoid matter, by M. P. Schützenberger.—On the action of electrolytic oxygen on methylic alcohol, by M. A. Renard; experiments made in continuation of those described on Jan. 11 (see NATURE, vol. xi. p. 240). The results were similar, producing acetic acid, acetate of methyl, and methyl-sulphuric acid. The formation of acetic acid from methylic alcohol is explained by the formulæ—

$$\left.\begin{matrix}CH_3\\H\end{matrix}\right\}O + 2O = 2H_2O + CO$$

$$CO + \left.\begin{matrix}CH_3\\H\end{matrix}\right\}O = \left.\begin{matrix}CH_3CO\\H\end{matrix}\right\}O$$

—On the flame of sulphur, and the different lights that can be utilised in photography, by MM. A. Riche and C. Bardy. The authors examined eight different flames, viz., the oxy-hydrogen light, Drummond's lime-light, zinc burning in oxygen, the magnesium flame, a current of nitric oxide gas burning in a globe containing bisulphide of carbon, a jet of nitric oxide gas on a test containing bisulphide of carbon, a jet of oxygen on the same, and a jet of oxygen on a test containing sulphur. The eight lights showed their photographic power in the order mentioned, the last being eight times as strong as the first.—After some short mathematical notes, M. D. Lontin read a paper on his improvements of dynamo-electric machines.—A note by M. Lecareux, on the treatment of cholera.—A memoir by M. Anninos, on the direction of aërostats.—MM. Hemmerich, Bourquelot, Chaperon, Heyduck, and Robinson then made some communications on Phylloxera. The Minister for Agriculture and Commerce has placed more funds at the disposal of the Academy for the investigation of this subject.—A letter was then read, dated Noumea, Nov. 4, 1874, from MM. André and Angot, announcing their successful installation for the observation of the Transit of Venus.—The Minister for Foreign Affairs transmitted to the Academy documents received from the French Consul at Manilla, with reference to the same subject, and announcing the forwarding of ten photographic proofs taken during the transit.—A letter on the same subject from M. Héraud, dated Saigon, Dec. 18, giving a complete description of the observations and their results.—A letter from Mr. J. Norman Lockyer, describing the preparations for the expedition sent by the Royal Society of London to observe the total eclipse of the sun. The observations will be mainly confined to the spectra of the chromosphere and the coronal atmosphere, with the principal view to determine the chemical constitution of the latter.—On elimination; calculation of Sturm's functions by determinants, by M. Lemonnier.—A note on the partition of numbers, by Mr. Glaisher.—A note on the theory of surfaces, by M. Halphen.—On a formula of transformation of elliptic functions, by M. J. Brioschi.—A note by M. T. Schloesing, on atmospheric ammonia.—On the presence of copper in the organism, by MM. Bergeron and L'Hôte.—On the general phenomena of the embryogeny of Nemertida, by M. J. Barrois. M. de Quatrefages then made a few remarks on this paper.—On the organs of touch in man, by M. Jobert.—On the invasion of grasshoppers in Algeria (April—August, 1874), by M. Brocard.—On the electro-chemical resistance of aluminium when employed as a positive electrode of a voltameter, by M. Ducretet.—M. Chapelas then gave an account of barometrical observations he made in Paris during the gale on Jan. 21.—M. Mangot read a note on the causes of the rupture of axles, and generally of pieces of iron, that are subjected to repeated vibrations.

BOOKS AND PAMPHLETS RECEIVED

BRITISH.—The Native Races of the Pacific States of North America: Hubert Howe Bancroft (Longmans).—Assyrian Discoveries: George Smith (Sampson Low and Marston).—Valleys, and their Relation to Fissures, Fractures, and Faults: C. H. Kinahan, M.R.I.A., F.R.G.S.I., &c. (Trübner).—Newcastle-upon-Tyne Chemical Society; On the Manufacture of Caustic Soda.—Bird Life, by Dr. A. E. Brehm. Translated by H. M. Labouchere, F.Z.S., and W. Jesse, C.M.Z.S. Parts 5 to 10 (John Van Voorst).—Logarithmic and Trigonometrical Tables for Approximate Calculation: J. T Bottomley, M.A., F.R.S.E. (Wm. Collins).—Fragmentary Papers by the late Sir H. Holland: Rev. J. Holland (Longmans).—Outline of the Evolution-Philosophy, by Dr. M. E. Gazelles. Translated by the Rev. O. B. Frothingham, of New York (Trübner).—The History of India from the Earliest Ages. Vol. iii.: J. Talboys Wheeler (Trübner).—The Countess of Chinchon and the Chinchona Genus: Clements R. Markham, C.B., F.R.S. (Trübner).

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